

What is Claimed Is:

1. A method in an access router, the method comprising:

supplying to a first mobile router a delegated address prefix, based on attachment by the first mobile router to one of the access router and a second mobile router attached to the access router, each mobile router in a local mobile network serviced by the access router receiving a corresponding unique delegated address prefix for use within the local mobile network; and

5 registering a remote care-of address having the delegated address prefix with a prescribed home agent of the first mobile router, to register a reachability of the first mobile router.

2. The method of claim 1, further comprising outputting a router advertisement message having a prefix option and a tree information option, the prefix option specifying an available network prefix for use within the local mobile network, the tree information option specifying that the access router is a top level router and configured as a delegating router for supplying the delegated address prefix.

3. The method of claim 2, wherein the supplying step includes:

receiving from the first mobile router a request for the delegated address prefix and that includes a reverse routing header specifying a path to the first mobile router including a local care-of address within an address space of the available network prefix, the request further including a source address field specifying a first hop for the path;

assigning the delegated address prefix to the first mobile router, from an aggregation of prefixes within the available network prefix, by updating a binding cache entry with the delegated address prefix reachable via the local care-of address; and

sending to the first hop for the path the delegated address prefix for the first mobile router in a packet including a source route header specifying the path.

4. The method of claim 3, wherein the second mobile router is assigned a second delegated address prefix distinct from the delegated address prefix and within the address space of the available

network prefix, the local care-of address within the address space of the second delegated address prefix.

5. The method of claim 4, wherein the registering step includes forwarding a binding update message from the first mobile router to the prescribed home agent, the binding update message specifying at least one of the first mobile router and a native mobile network prefix assigned to the first mobile router by the home agent is reachable via the remote care-of address.

6. The method of claim 5, wherein the forwarding step includes:  
removing from the binding update message the reverse routing header, and storing in a binding cache entry that the local care-of address is reachable via the path including the first hop for the path,  
inserting an address of the access router in the source address field of the binding update message, and  
forwarding the binding update message without the reverse routing header to the prescribed home agent.

7. The method of claim 4, further comprising:  
receiving a second binding update message from the first mobile router specifying a second local care-of address within the address space of the available network prefix and distinct from the second delegated address prefix, the second binding update superseding the local care-of address;  
and  
updating the binding cache entry with the delegated address prefix and the first mobile router reachable via the second local care-of address.

8. The method of claim 1, further comprising outputting a router advertisement message specifying an available network prefix for use within the local mobile network, and wherein:  
the second mobile router is assigned a second delegated address prefix distinct from the

delegated address prefix and within an address space of the available network prefix, the local care-of address within the address space of the second delegated address prefix.

9. The method of claim 8, wherein the registering step includes forwarding a binding update message from the first mobile router to the prescribed home agent, the binding update message specifying at least one of the first mobile router and a native mobile network prefix assigned to the first mobile router by the home agent is reachable via the remote care-of address.

10. The method of claim 9, wherein the forwarding step includes:  
removing from the binding update message the reverse routing header, and storing in a binding cache entry that the local care-of address is reachable via the path including the first hop for the path,

inserting an address of the access router in the source address field of the binding update message, and

forwarding the binding update message without the reverse routing header to the prescribed home agent.

11. A method in a mobile router, the method comprising:  
detecting a router advertisement message output by a second mobile router serving as an attachment router for the mobile router, the router advertisement message having a prefix option and a tree information option, the prefix option specifying a first network prefix for use within a local mobile network serviced by the second mobile router, the tree information option specifying an access router as a top level router and that is configured as a delegating router for supplying delegated address prefixes;

generating a local care-of address based on the first network prefix;  
outputting a request for a delegated prefix from the access router via the second mobile router;

receiving the delegated prefix assigned by the access router, the delegated prefix distinct from the first network prefix; and

advertising the delegated prefix on ingress links of the mobile router.

12. The method of claim 11, further comprising:

generating a home care-of address based on the delegated prefix; and

sending via the second mobile router a binding update message to a home agent, specifying at least one of the mobile router and a native mobile network prefix assigned by the home agent to the mobile router is reachable via the home care-of address.

13. The method of claim 12, wherein the outputting and sending steps each include inserting a reverse routing header that includes the local care-of address and a prescribed number of empty slots for the second mobile router and any intervening hops along a path to the access router.

14. The method of claim 12, further comprising:

detecting a second router advertisement message output by the access router and having a second prefix option and the tree information option identifying the access router as the top level mobile router and the delegating router, the second prefix option specifying an available network prefix for use within a local mobile network serviced by the access router;

attaching to the access router by:

(1) replacing the local care-of address with a new local care-of address based on the available network prefix, and

(2) sending to the access router a binding update message that specifies that the mobile router and the delegated prefix is reachable via the new local care-of address.

15. An access router configured for providing connectivity to a wide area packet switched network for a local mobile network, the access router including:

a delegation resource configured for supplying to each mobile router a corresponding delegated address prefix, each of the delegated address prefixes within an available network prefix for use within the local mobile network; and

a routing resource including a routing table configured for storing, for each delegated address prefix, a corresponding local care-of address for reaching the corresponding mobile router in the local mobile network.

16. The access router of claim 15, wherein the routing resource includes a router advertisement resource configured for outputting a router advertisement message including a prefix option and a tree information option, the prefix option specifying the available network prefix for use within the local mobile network, the tree information option specifying that the access router is a top level router and configured as a delegating router for supplying the delegated address prefix.

17. The access router of claim 16, wherein:

the routing resource includes a reverse routing header resource configured for establishing a source route for reaching a corresponding one of the local care-of addresses based on successive next-hop addresses specified within a reverse routing header of a received message from the corresponding mobile router;

the delegation resource is configured for receiving from a first of the mobile routers a request for a corresponding first delegated address prefix and that includes a reverse routing header specifying a path to the first mobile router including a local care-of address within an address space of the available network prefix, the request further including a source address field specifying a first hop for the path;

the delegation resource is configured for assigning the first delegated address prefix to the first mobile router, from an aggregation of prefixes within the available network prefix, by updating a binding cache entry with the first delegated address prefix reachable via the local care-of address;

the delegation resource sending, to the first hop for the path, the first the delegated address prefix for the first mobile router in a packet including a source route header specifying the path.

18. The access router of claim 17, wherein the local care-of address is within the address space of a second delegated address prefix assigned to a corresponding second one of the mobile routers.

19. The access router of claim 18, wherein:

the routing resource is configured for receiving a binding update message from the first mobile router and destined for a prescribed home agent, specifying at least one of the first mobile router and a native mobile network prefix assigned by the prescribed home agent to the first mobile router is reachable via a home care-of address having the first delegated address prefix;

the reverse routing header resource configured for removing from the binding update message an attached reverse routing header, and storing in a binding cache entry that the local care-of address is reachable via the path including the first hop for the path;

the routing resource configured for inserting an address of the access router in the source address field of the binding update message, and forwarding the binding update message without the reverse routing header to the prescribed home agent.

20. The access router of claim 17, wherein:

the routing resource is configured for receiving a second binding update message from the first mobile router specifying a second local care-of address within the address space of the available network prefix and distinct from the second delegated address prefix, the second binding update superseding the local care-of address; and

the routing resource configured for updating the binding cache entry with the first delegated address prefix and the first mobile router reachable via the second local care-of address.

21. A mobile router comprising:

an egress interface configured for receiving a router advertisement message output by a second mobile router serving as an attachment router for the mobile router, the router advertisement message having a prefix option and a tree information option, the prefix option specifying a first network prefix for use within a local mobile network serviced by the second mobile router, the tree information option specifying an access router as a top level router and that is configured as a delegating router for supplying delegated address prefixes; and

a routing resource including:

(1) a mobility resource configured for generating a local care-of address based on the first network prefix, and outputting via the egress interface a request for a delegated prefix from the access router via the second mobile router, the mobility interface configured for receiving the delegated prefix, distinct from the first network prefix, from the access router, and

(2) an advertisement resource configured for outputting, on an ingress interface, an advertisement message specifying the delegated prefix.

22. The mobile router of claim 21, wherein the mobility resource is configured for generating a home care-of address based on the delegated prefix, and sending via the second mobile router a binding update message to a home agent, the binding update message specifying at least one of the mobile router and a native mobile network prefix assigned to the mobile router by the home agent is reachable via the home care-of address.

23. The mobile router of claim 22, wherein the mobility resource is configured for inserting a reverse routing header that includes the local care-of address and a prescribed number of empty slots for the second mobile router and any intervening hops along a path to the access router.

24. The mobile router of claim 22, wherein:

the egress interface is configured for receiving a second router advertisement message output by the access router and having a second prefix option and the tree information option identifying the access router as the top level mobile router and the delegating router, the second prefix option specifying an available network prefix for use within a local mobile network serviced by the access router;

the mobility resource is configured for to the access router by:

(1) replacing the local care-of address with a new local care-of address based on the available network prefix, and

(2) sending to the access router a binding update message that specifies that the mobile router and the delegated prefix is reachable via the new local care-of address.

25. A computer readable medium having stored thereon sequences of instructions for providing connectivity by an access router for a local mobile network, the sequences of instructions including instructions for:

supplying to a first mobile router a delegated address prefix, based on attachment by the first mobile router to one of the access router and a second mobile router attached to the access router, each mobile router in a local mobile network serviced by the access router receiving a corresponding unique delegated address prefix for use within the local mobile network; and

registering a remote care-of address having the delegated address prefix with a prescribed home agent of the first mobile router, to register a reachability of the first mobile router.

26. The medium of claim 25, further comprising instructions for outputting a router advertisement message having a prefix option and a tree information option, the prefix option specifying an available network prefix for use within the local mobile network, the tree information option specifying that the access router is a top level router and configured as a delegating router for supplying the delegated address prefix.

27. The medium of claim 26, wherein the supplying step includes:

receiving from the first mobile router a request for the delegated address prefix and that includes a reverse routing header specifying a path to the first mobile router including a local care-of address within an address space of the available network prefix, the request further including a source address field specifying a first hop for the path;

assigning the delegated address prefix to the first mobile router, from an aggregation of prefixes within the available network prefix, by updating a binding cache entry with the delegated address prefix reachable via the local care-of address; and

sending to the first hop for the path the delegated address prefix for the first mobile router in a packet including a source route header specifying the path.

28. The medium of claim 27, wherein the second mobile router is assigned a second delegated address prefix distinct from the delegated address prefix and within the address space of



the available network prefix, the local care-of address within the address space of the second delegated address prefix.

29. The medium of claim 28, wherein the registering step includes forwarding a binding update message from the first mobile router to the prescribed home agent, the binding update message specifying at least one of the first mobile router and a native mobile network prefix assigned to the first mobile router by the home agent is reachable via the remote care-of address.

30. The medium of claim 29, wherein the forwarding step includes:  
removing from the binding update message the reverse routing header, and storing in a binding cache entry that the local care-of address is reachable via the path including the first hop for the path,  
inserting an address of the access router in the source address field of the binding update message, and  
forwarding the binding update message without the reverse routing header to the prescribed home agent.

31. The medium of claim 28, further comprising instructions for:  
receiving a second binding update message from the first mobile router specifying a second local care-of address within the address space of the available network prefix and distinct from the second delegated address prefix, the second binding update superseding the local care-of address;  
and  
updating the binding cache entry with the delegated address prefix and the first mobile router reachable via the second local care-of address.

32. The medium of claim 25, further comprising instructions for outputting a router advertisement message specifying an available network prefix for use within the local mobile network, and wherein:

the second mobile router is assigned a second delegated address prefix distinct from the delegated address prefix and within an address space of the available network prefix, the local care-of address within the address space of the second delegated address prefix.

33. The medium of claim 32, wherein the registering step includes forwarding a binding update message from the first mobile router to the prescribed home agent, the binding update message specifying at least one of the first mobile router and a native mobile network prefix assigned to the first mobile router by the home agent is reachable via the remote care-of address.

34. The medium of claim 33, wherein the forwarding step includes:

removing from the binding update message the reverse routing header, and storing in a binding cache entry that the local care-of address is reachable via the path including the first hop for the path,

inserting an address of the access router in the source address field of the binding update message, and

forwarding the binding update message without the reverse routing header to the prescribed home agent.

35. A computer readable medium having stored thereon sequences of instructions for a mobile router to attach to a local mobile network, the sequences of instructions including instructions for:

detecting a router advertisement message output by a second mobile router serving as an attachment router for the mobile router, the router advertisement message having a prefix option and a tree information option, the prefix option specifying a first network prefix for use within a local mobile network serviced by the second mobile router, the tree information option specifying an access router as a top level router and that is configured as a delegating router for supplying delegated address prefixes;

generating a local care-of address based on the first network prefix;

outputting a request for a delegated prefix from the access router via the second mobile router;

receiving the delegated prefix assigned by the access router, the delegated prefix distinct from the first network prefix; and

advertising the delegated prefix on ingress links of the mobile router.

36. The medium of claim 35, further comprising instructions for:

generating a home care-of address based on the delegated prefix; and

sending via the second mobile router a binding update message to a home agent, the binding update message specifying at least one of the mobile router and a native mobile network prefix assigned by the home agent to the mobile router is reachable via the home care-of address.

37. The medium of claim 36, wherein the outputting and sending steps each include inserting a reverse routing header that includes the local care-of address and a prescribed number of empty slots for the second mobile router and any intervening hops along a path to the access router.

38. The medium of claim 36, further comprising instructions for:

detecting a second router advertisement message output by the access router and having a second prefix option and the tree information option identifying the access router as the top level mobile router and the delegating router, the second prefix option specifying an available network prefix for use within a local mobile network serviced by the access router;

attaching to the access router by:

(1) replacing the local care-of address with a new local care-of address based on the available network prefix, and

(2) sending to the access router a binding update message that specifies that the mobile router and the delegated prefix is reachable via the new local care-of address.

39. An access router comprising:

means for supplying to a first mobile router a delegated address prefix, based on attachment by the first mobile router to one of the access router and a second mobile router attached to the access router, each mobile router in a local mobile network serviced by the access router receiving a corresponding unique delegated address prefix for use within the local mobile network; and

means for registering a remote care-of address having the delegated address prefix with a prescribed home agent of the first mobile router, to register a reachability of the first mobile router.

40. The access router of claim 39, wherein the registering means includes means for outputting a router advertisement message having a prefix option and a tree information option, the prefix option specifying an available network prefix for use within the local mobile network, the tree information option specifying that the access router is a top level router and configured as a delegating router for supplying the delegated address prefix.

41. The access router of claim 40, wherein the supplying means is configured for:

receiving from the first mobile router a request for the delegated address prefix and that includes a reverse routing header specifying a path to the first mobile router including a local care-of address within an address space of the available network prefix, the request further including a source address field specifying a first hop for the path;

assigning the delegated address prefix to the first mobile router, from an aggregation of prefixes within the available network prefix, by updating a binding cache entry with the delegated address prefix reachable via the local care-of address; and

sending to the first hop for the path the delegated address prefix for the first mobile router in a packet including a source route header specifying the path.

42. The access router of claim 41, wherein the second mobile router is assigned a second delegated address prefix distinct from the delegated address prefix and within the address space of the available network prefix, the local care-of address within the address space of the second delegated address prefix.

43. The access router of claim 42, wherein the registering means is configured for forwarding a binding update message from the first mobile router to the prescribed home agent, the binding update message specifying at least one of the first mobile router and a native mobile network prefix assigned to the first mobile router by the home agent is reachable via the remote care-of address.

44. The access router of claim 43, wherein the registering means is configured for:  
removing from the binding update message the reverse routing header, and storing in a binding cache entry that the local care-of address is reachable via the path including the first hop for the path,  
inserting an address of the access router in the source address field of the binding update message, and  
forwarding the binding update message without the reverse routing header to the prescribed home agent.

45. The access router of claim 42, wherein the registering means is configured for:  
receiving a second binding update message from the first mobile router specifying a second local care-of address within the address space of the available network prefix and distinct from the second delegated address prefix, the second binding update superseding the local care-of address;  
and  
updating the binding cache entry with the delegated address prefix and the first mobile router reachable via the second local care-of address.

46. The access router of claim 39, wherein the registering means includes means for outputting a router advertisement message specifying an available network prefix for use within the local mobile network, and wherein:

the second mobile router is assigned a second delegated address prefix distinct from the delegated address prefix and within an address space of the available network prefix, the local care-of address within the address space of the second delegated address prefix.

47. The access router of claim 46, wherein the registering means is configured for forwarding a binding update message from the first mobile router to the prescribed home agent, the binding update message specifying at least one of the first mobile router and a native mobile network prefix assigned to the first mobile router by the home agent is reachable via the remote care-of address.

48. The access router of claim 47, wherein the registering means is configured for forwarding the binding update message based on:

removing from the binding update message the reverse routing header, and storing in a binding cache entry that the local care-of address is reachable via the path including the first hop for the path,

inserting an address of the access router in the source address field of the binding update message, and

forwarding the binding update message without the reverse routing header to the prescribed home agent.

49. A mobile router comprising:

means for detecting a router advertisement message output by a second mobile router serving as an attachment router for the mobile router, the router advertisement message having a prefix option and a tree information option, the prefix option specifying a first network prefix for use within a local mobile network serviced by the second mobile router, the tree information option specifying an access router as a top level router and that is configured as a delegating router for supplying delegated address prefixes, the detecting means including means for generating a local care-of address based on the first network prefix;

means for outputting a request for a delegated prefix from the access router via the second mobile router, and for receiving the delegated prefix assigned by the access router, the delegated prefix distinct from the first network prefix; and

means for advertising the delegated prefix on ingress links of the mobile router.

50. The mobile router of claim 49, wherein:

the generating means is configured for generating a home care-of address based on the delegated prefix; and

the outputting means is configured for sending via the second mobile router a binding update message to a home agent, the binding update message specifying at least one of the mobile router and a native mobile network prefix assigned to the mobile router by the home agent is reachable via the home care-of address.

51. The mobile router of claim 50, wherein the detecting means includes means for inserting, into the request and the binding update message, a reverse routing header that includes the local care-of address and a prescribed number of empty slots for the second mobile router and any intervening hops along a path to the access router.

52. The mobile router of claim 50, wherein:

the detecting means is configured for detecting a second router advertisement message output by the access router and having a second prefix option and the tree information option identifying the access router as the top level mobile router and the delegating router, the second prefix option specifying an available network prefix for use within a local mobile network serviced by the access router;

the generating means is configured for attaching to the access router by:

(1) replacing the local care-of address with a new local care-of address based on the available network prefix, and

(2) sending to the access router a binding update message that specifies that the mobile router and the delegated prefix is reachable via the new local care-of address.